In graph D the data, from which graphs A, B, and C were prepared, were averaged so that this shows the annual and progressive and successive 5-year mean precipitation for the whole western Great Plains region.

This indicates two well-defined crests in rainfall about 25 years apart, with the low part of the curves at the beginning, middle, and end of the period of 50 years.

The average precipitation for the 25 years from 1868 to 1892, inclusive, was 19.2 inches, and from 1893 to 1917, inclusive, 18.4 inches. The average for each 10 years is shown in Table 4.

TABLE 4.—*Precipitation for each 10 years from 1868 to 1917, inclusive, over the western Great Plains.*

Period.	Precipitation (inches).
1868–1877	18.1
1878–1887	20.4
1888–1897	17.5
1898–1907	19.9
1908–1917	18.4

There has been a decided increase in the area unerd cultivation in the Great Plains States during the past 50 years as brought out by figures in Table 5.

If increasing the area under cultivation in any district increased the precipitation, we should expect a steady rise in the annual rainfall amount over the region covered by this study. Instead of finding a regular increase, the graphs in figure 2 make plain that there are well-defined but comparatively short periods of increasing and decreasing rainfall, but which can not be due to cultivation. The crop area is being extended into the drier region because of crop adaptation and better farming methods. Moisture is conserved that formerly ran off, dry-farming methods are being adopted, and crops better adapted to the region are being planted.

An interesting fact in connection with the precipitation records is that dry years occasionally occur during a wet period or wet years in a dry period. This is brought out by the light rainfall in 1882 in graph B, and the very heavy rainfall in 1915 in graph D.

TABLE 5.—*Acreage of certain grain crops in the Great Plains States.*

Crop and State.	Year. 1867	1882	1892	1917
	Acres.	*Acres.*	*Acres.*	*Acres.*
Barley:				
Kansas	224	20,882	13,901	750,000
Nebraska	222	156,000	90,223	213,000
The Dakotas		28,273	321,693	2,845,000
Montana		1,852	5,032	90,000
Corn:				
Kansas	6,555	472,619	1,547,175	9,156,000
Nebraska	11,479	400,119	1,615,393	9,240,000
The Dakotas		140,000		3,940,000
Montana		492	1,080	81,000
Oats:				
Kansas	6,555	472,619	1,547,175	2,284,000
Nebraska	11,479	400,119	1,615,393	3,038,000
The Dakotas		140,000	1,174,449	4,500,000
Montana		28,000	66,323	680,000
Wheat:				
Kansas	89,285	1,573,000	4,070,724	3,737,000
Nebraska	9,917	1,657,000	1,253,564	997,000
The Dakotas		720,000	5,410,077	10,716,000
Montana		42,812	41,761	1,727,000

The opinion is expressed by some students of weather data that dry and wet years come in groups of two or three each, but this belief is not substantiated by these charts. In other words, it is not possible to predict what the total precipitation for any year will be from past records. A wet year may be followed by another wet one or by a very dry year, or vice versa. For example, the dry year of 1890, in graph B, was followed by one of the wettest in the whole period, while the dry year of 1913 was followed by one equally dry.

In graph D it will be seen that the wet year of 1877 was followed by one nearly as wet; that of 1891 by a rainfall not far from the normal; that of 1905 by another wet year, and 1915 by one with considerably less precipitation than the normal.

AUSTRALIAN DROUGHTS.

By CHESTER RICHARDSON.

[Dated: Currie, King Island, Tasmania, Oct. 25, 1919.]

Although the primary causes of drought are unknown, an indicator apparently of immediate value is the mean temperature difference for the months June, July, and August, between the southern portion of Australia, and the source from which the latter obtains its rainfall in *the months names*, viz, the belt of drift weather, which in normal winters extends along a fairly direct line from west to east, in proximity to the 40th parallel of latitude in the Great Southern Ocean. The highest mean temperature difference between the belt and the southern seaboard of Australia obtains in usual winter seasons, when the elements contained in the belt traverse the course above-mentioned. In these conditions, the mean land temperature being higher than that of the belt, the cooler air of the latter shows landwards in convectional circulation to restore equilibrium. The result is SW. winds and rain upon the land.

The lowest mean temperature difference occurs when the belt—from some cause at present unknown—curves northward, or over a portion of the South Indian Ocean, and, in regaining its easting, carries with it atmosphere of considerably higher temperature than when traversing the 40th parallel course. The effect of this warm general NW. wind is to cause the dry land air to flow *toward* the belt, and as a consequence, drought or droughty conditions ultimately ensue.[1] Since such a northward curvature over the Indian Ocean seems to persist for months at a time, persistent NW. winds in Westralia and Tasmania may give indication of a droughty season to follow.

[1] Perhaps associated with the distribution of ocean surface temperatures. Cf. MONTHLY WEATHER REVIEW, November, 1918, 46: 510–514.